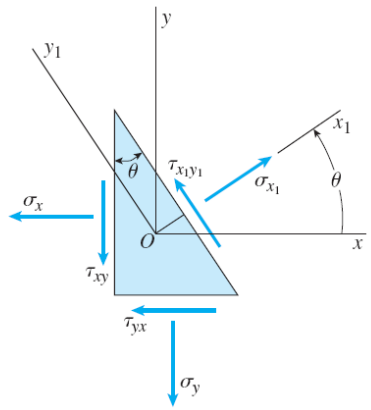
Hoja de Fórmulas para exámenes finales de Estática y Resistencia de Materiales



$$\sigma_{x_1} = \sigma_x \cos^2\theta + \sigma_y \operatorname{sen}^2\theta + 2\tau_{xy} \operatorname{sen}\theta\cos\theta$$

$$\tau_{x_1y_1} = -(\sigma_x - \sigma_y)\operatorname{sen}\theta\cos\theta + \tau_{xy}(\cos^2\theta - \operatorname{sen}^2\theta)$$

$$\sigma_{x_1} = \frac{\sigma_x + \sigma_y}{2} + \frac{\sigma_x - \sigma_y}{2}\cos 2\theta + \tau_{xy}\operatorname{sen} 2\theta$$

$$\tau_{x_1y_1} = -\frac{\sigma_x - \sigma_y}{2}\operatorname{sen} 2\theta + \tau_{xy}\cos 2\theta$$

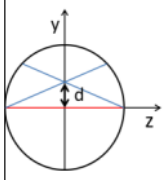
$$\tau_{\max} = \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$$

$$\sigma_{1,2} = \frac{\sigma_x + \sigma_y}{2} \pm \sqrt{\left(\frac{\sigma_x - \sigma_y}{2}\right)^2 + \tau_{xy}^2}$$

$$P_{crit} = \frac{\pi^2 E I}{L_e^2} \qquad i^2 = {}^{I}/_{A} \qquad \lambda = {}^{L_e}/_{i}$$

Sección Circular

$$I_z = \frac{\pi D^4}{64} = I_y$$

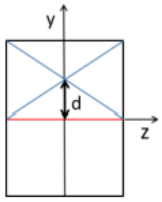


$$A = \frac{\pi R^2}{2} \qquad d = \frac{4R}{3\pi}$$

$$S_{máx} = \frac{2}{3}R^3 = \frac{D^3}{12}$$

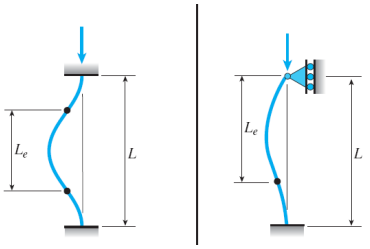
Sección Rectangular

$$I_z = \frac{bh^3}{12} \; ; \; I_y = \frac{hb^3}{12}$$

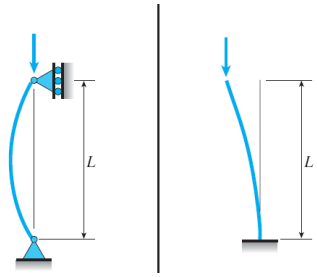


$$A = \frac{bh}{2} \qquad d = \frac{h}{4}$$

$$S_{máx} = \frac{bh^2}{8}$$



Le=0,5L *Le=0,7 L*



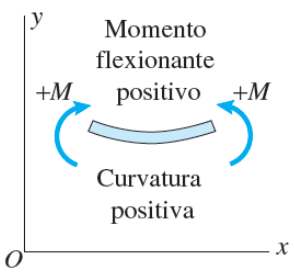
Le=L *Le=2L*

SOLICITACIÓN AXIL			
$\sigma_x = \frac{N_x}{A}$	$\varepsilon_x = \frac{\Delta L}{L}$	$\varepsilon_{térmica} = \alpha\,\Delta T°$	$\varepsilon_{mecánica} = \frac{N_x}{E\,A}$

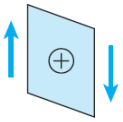
TORSIÓN		
$\theta_{BA} = \int_0^L \frac{M_t}{G.I_P}dx$	$I_P = \frac{\pi D^4}{32} = \frac{\pi\,(D_e^4 - D_i^4)}{32}$	$\tau_r = \frac{M_t}{I_P}\,r \;\; [\tau_{máx} \rightarrow r_{máx}]$

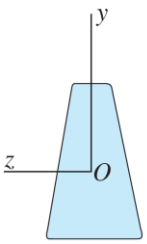
UNIDADES	
$Pa = \frac{[N]}{[m^2]}$	$MPa = \frac{[N]}{[mm^2]}$
$psi = \frac{[lbf]}{[in^2]}$	$ksi = \frac{[kip]}{[in^2]}$

1 kPa=10^3Pa	1 kN=10^3N
1 MPa=10^6Pa	1 MN=10^6N
1 GPa=10^9Pa	1 GN=10^9N



Corte





$$\sigma = \frac{N}{A} - \frac{My}{I}$$

$$\tau_{xy} = \frac{Q_y\,S}{I_z\,b}$$

Tensión en recipiente esférico

$$\sigma = \frac{pr}{2t}$$

Tensiones en recipientes cilíndricos:

Circunferencial

$$\sigma_1 = \frac{pr}{t}$$

Longitudinal

$$\sigma_2 = \frac{pr}{2t}$$